

LB

3231

28

1890

8

31

8

70

REPORT
OF
COMMITTEE ON SANITATION
OF THE
SCHOOL COMMITTEE
OF THE
CITY OF LYNN,
FOR THE YEAR 1890.



LYNN, MASS.:
G. H. & W. A. NICHOLS, PRINTERS.
1891.

REPORT
OF
COMMITTEE ON SANITATION
OF THE
SCHOOL COMMITTEE
OF THE
CITY OF LYNN,
FOR THE YEAR 1890.



LYNN, MASS.:
G. H. & W. A. NICHOLS, PRINTERS.
1891.

h B 3231

h 2

REPORT OF COMMITTEE ON SANITATION.

To the School Committee of the City of Lynn:

The Committee on Sanitation has during the past year continued its work of taking measures to render the schools and their surroundings conducive to the health and comfort of teachers and pupils. The relatively small amount of \$2,000, included in the annual estimates for this committee, has limited its work to the more urgent instances where such improvements were necessary, but great care has been given by the Committee on Education of the City Government, to matters pertaining to sanitation in new schoolhouses in process of construction, leaving to this committee the more pressing work of making changes in some of the older school buildings of the city. Many of the changes made in buildings by the Committee on Schoolhouses were carried out concurrently with the work of the Sanitation Committee, or embodied the views of the members of the Sanitation Committee, as a result of conferences between these two committees whose intimate relations have been of a most harmonious nature. These circumstances show why expenditures directly made by this committee do not represent the whole amount of work done in the interest of sanitation in the Public Schools in Lynn.

ORDER SYSTEM.

In order to bring the method of purchases to a more

strictly commercial basis, and to prevent as far as possible a recurrence of disputed bills, this committee adopted at the first of the year a system of orders like the following:

Committee on Sanitation.

No. _____

School Department.

189 _____

Order to _____

School _____

For _____

APPROVED :

School-House Mechanic.

*Chairman Committee on
Sanitation.*

SCHOOL DEPARTMENT.

COMMITTEE ON SANITATION.

☞ Use this number on Bill No. _____

LYNN, MASS., 189 _____

M. _____

Please deliver the following goods at the _____

School, on _____ Street, _____

School-House Mechanic.

APPROVED, _____

Chairman Committee on Sanitation.

These orders are bound in books and the stubs serve as a memorandum of each charge and are of great use in auditing bills. This system has been very satisfactory in its practical operation. The Committee on Schoolhouses uses similar orders, but printed on differently colored paper.

INSPECTION.

Frequent instances of defects requiring immediate attention, which were not reported by either janitors, or teachers have led this committee to introduce a method of monthly inspection, and report of the condition of the school property.

Cards have been printed containing, on one side, items of the various features of a schoolhouse and yard, and also

SCHOOL COMMITTEE.

5

the various probable characteristics of their condition as shown herewith:

DRAW A LINE THROUGH WORDS TO BE SPECIFIED.
WRITE REMARKS ON OTHER SIDE.

1. YARD.....	Good Order.	Fair Order.	Neglected.
2. FENCES.....	Good Order.	Fair Order.	Neglected.
3. OUTBUILDINGS.....	Clean.	Fair.	Neglected.
4. FLUSH VAULTS....	Clean.	Good Order.	Neglected.
5. WATER CLOSETS.....	Clean.	Good Order.	Neglected.
6. SCHOOL ROOMS.....	Good Order.	Fair.	Neglected.
7. CELLARS.....	Good Order.	Ashes.	Neglected.
8. CLOSETS.....	Clean.	Orderly.	Neglected.
9. STOVES. FURNACES. STEAM.....	Good Order.	Fair Order.	Neglected.
10. VENTILATING APPARATUS.....	Good Order.	Fair.	Neglected.
11. SINKS AND FAUCETS.....	Good Order.	Fair. Leaky.	Neglected.
12. WINDOWS.....	Good Order.	Out of Order.	Glass b'k'n
13. NAME OF JANITOR.....			

The opposite side of the card affords space for any other comments which the inspector considers necessary.

LYNN SCHOOL DEPARTMENT.

COMMITTEE ON SANITATION.

INSPECTION OF SCHOOL PROPERTY.

_____ *School*

_____ *Street*

SPECIAL FAULTS OR REMARKS:

But little extra time is required on the part of the Schoolhouse Mechanic, who has been assigned to this work, as he takes forty of these cards early in the month, and makes the inspections, when he visits schoolhouses in the course of his other duties. At the close of the month he makes special visits for inspection only to the few schools, if any, which have not been already inspected in the course of other work.

This inspection has been very satisfactory in its results, bringing to the committee information of many matters needing more prompt attention than they would otherwise receive.

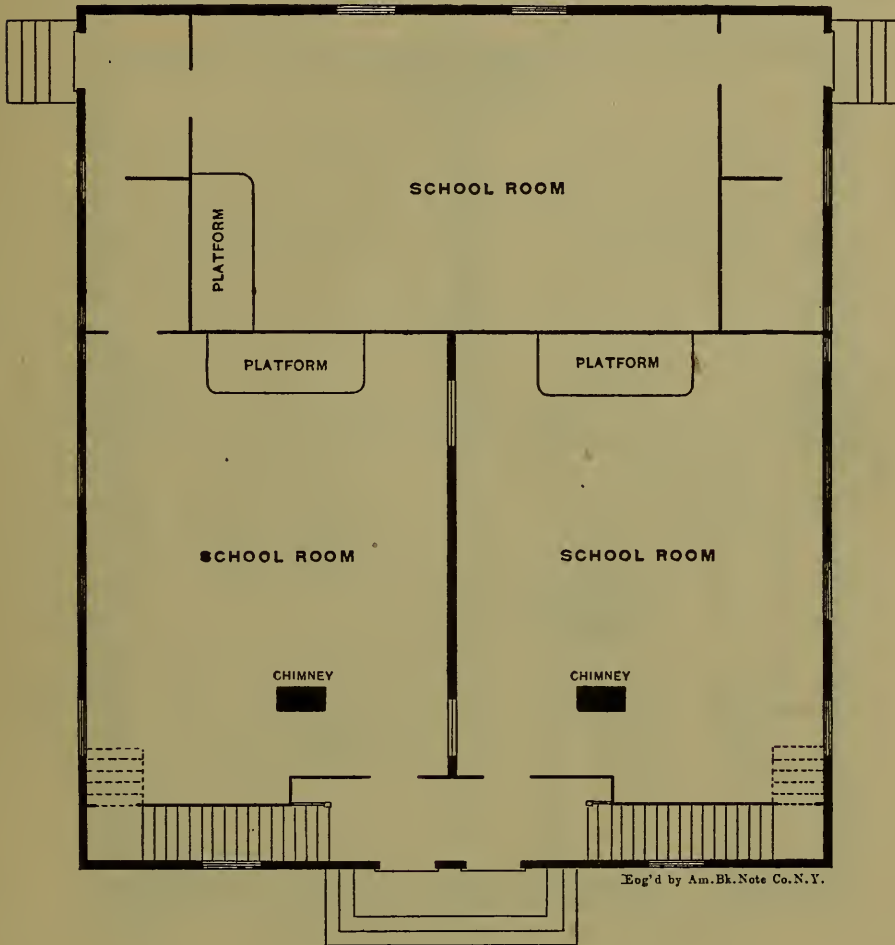
THE LYNN VENTILATION SYSTEM.

The principal work during the year has been the introduction of a system of heating and ventilation in the Centre Street School, at the same time that the building was being remodeled under the direction of the Committee on Schoolhouses. This building was erected for a Grammar School in 1853. After the construction of the Shepard Schoolhouse in 1869, the partitions were changed somewhat and the building used for one grammar and three primary schools; but it was inconvenient in its arrangements, and without any means for ventilation. The changes made in 1890 increased the number of desks, on the two floors, from two hundred and thirty to three hundred and fifty-six, and rendered the need of ventilation still more imperative than formerly.

The modifications in the arrangement of the building are shown in Figs. 1, 2, 3, 4.

The method of heating and ventilation is shown in its general arrangement by the plans, but in further detail, it may be said that each room is provided with a ventilating flue about two feet square, built of brick and covered with an Emerson ventilator made of No. 20 galvan-

ized iron. Each pair of flues is provided with a D. W. Cushing Ring Cylinder No. 4 stove, slightly modified for this special purpose by breaking off the projecting hearth, and



FRONT.

CENTRE ST. SCHOOL-HOUSE,
BEFORE REMODELLING.
1890.

(FIRST FLOOR.)
0 1 2 3 4 5 10
Scale of Feet.

FIG. I.

substituting a plate of No. 20 galvanized iron, eight inches in width, riveted to the bottom plate of the stove. This change of a portion of the stove, necessary

in ordinary use, is for the purpose of avoiding any obstruction of air currents in the flue. From each of these flue stoves, a six-inch smoke pipe extends to the top of the ventilating flue.

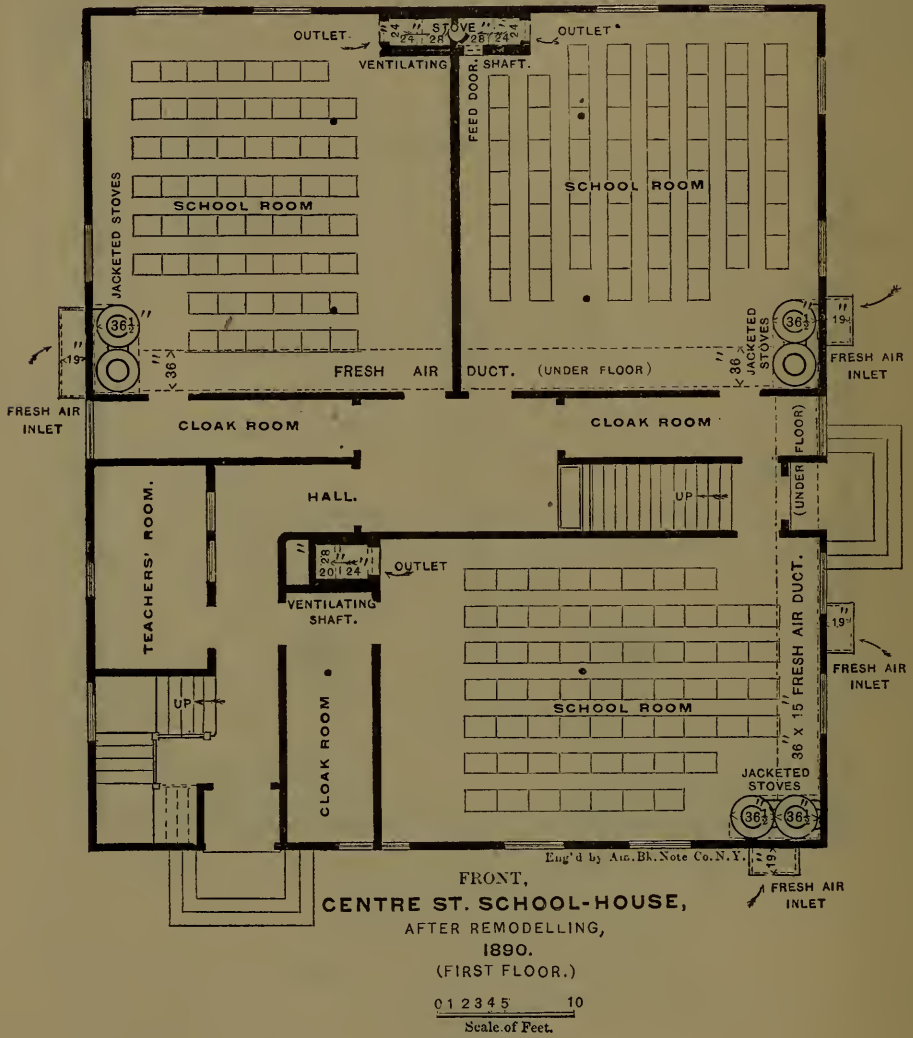
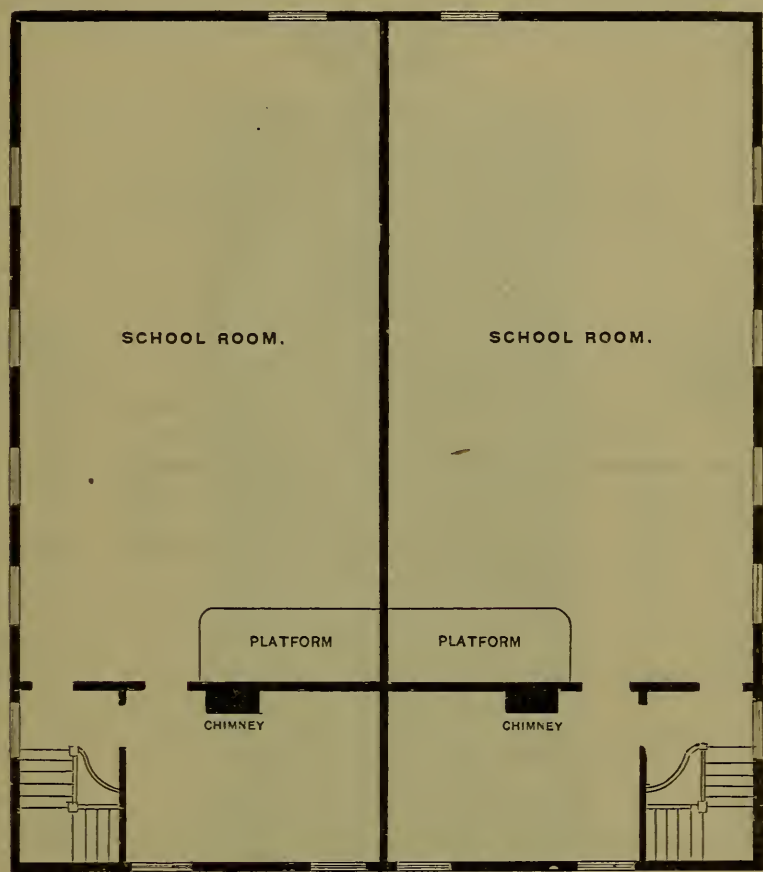


FIG. II.

Each of the rooms is heated by a pair of Barstow Puritan Schoolhouse stoves, this pattern having been selected for all the Lynn schools heated by stoves into which ventilation has been introduced, because

it is so well adapted to the application of the jacket peculiar to this system of ventilation. These stoves, shown in Fig. 5, are eighteen inches in diameter, and are surrounded by jackets made of No. 24 crimped galvanized



FRONT.
CENTRE ST. SCHOOL-HOUSE,
BEFORE REMODELLING,
1890.
(SECOND FLOOR.)
0 1 2 3 4 5 10
Scale of Feet.

FIG. III.

iron, thirty-six and a half inches in diameter, thus leaving a space of about nine inches around each stove, except at the doors, where suitable recesses make a tight joint. Each pair of these jackets is connected by an opening 12x20

inches, and there is a galvanized iron cover on one for use when only one stove is in service.

The general arrangement of jacketed stoves and air-ducts is shown in Fig. 5, illustrating the ventilation at

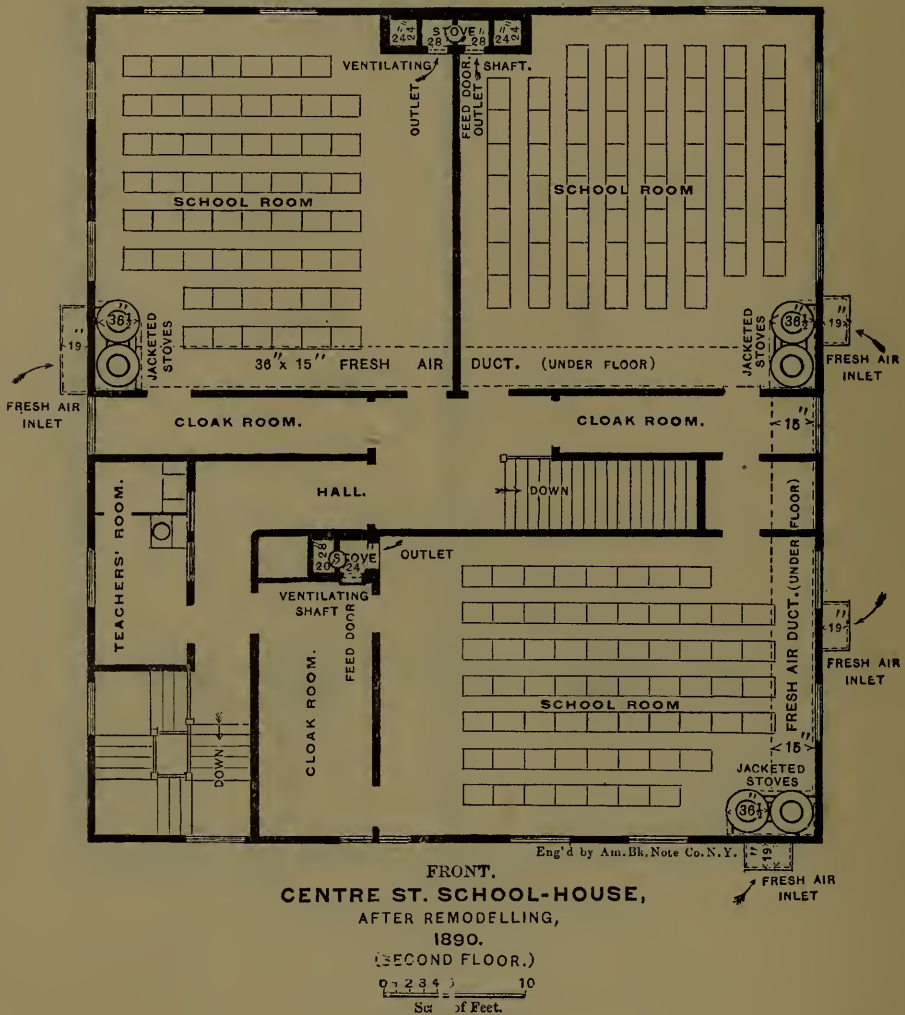


FIG. IV.

the Red Rock Street Schoolhouse, and taken from "Ventilation of School Rooms Heated by Stoves," by Joseph G. Pinkham, M. D., in Nineteenth Report Massachusetts State Board of Health, page 324.

The bottoms of these jackets are open and directly over fresh air-ducts leading to the outside of the building, where they are protected by wooden hoods and wire netting. The ducts are made of No. 26 galvanized iron with locked joints and are 36 inches wide and 14 inches deep. Each duct leads to open air inlets on two sides of

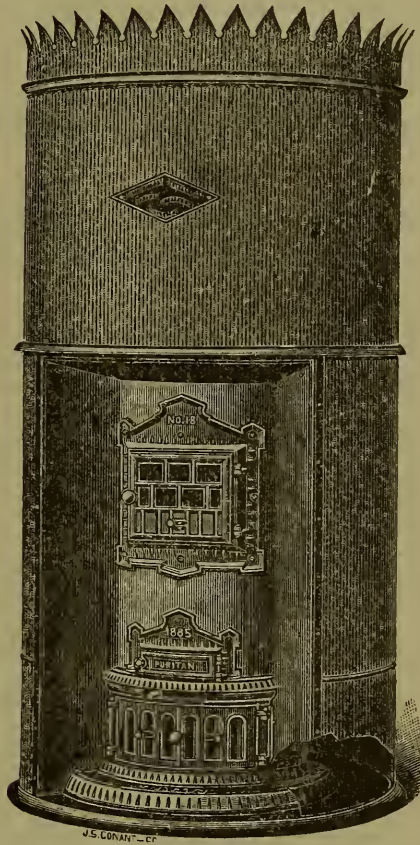


FIG. V.—JACKETED STOVE.

the building, and is provided with dampers, thus affording an opportunity to obtain a supply of air from the windward side of the building, and to regulate the amount of air supplied to the jackets around the stoves.

This system of heating and ventilation uniformly warms the room with fresh air, at any desired temperature, with a reasonable expenditure of fuel, and is at all times

under full control. That it does not necessitate any material change in the appearance of the school-room, is shown by Fig. 7, taken from a photograph of a room in the Red Rock Schoolhouse.

Those who were familiar with the rooms in the Centre Street Schoolhouse with their dummy ventilators leading into a closed attic, before the change was made, will not require any further evidence than the comparison of the former close, unevenly heated rooms, with the present condition in which the comfort and healthfulness are apparent to all.

Measurements of the quantity of air entering the ventilating flues have been made at various times by means of the anemometer.

The height of the lower story is 12 feet in the clear, and the height of the second story 15½ feet in the clear.

The cubical contents of the front room, No. 1, on the lower floor is 8,600 cubic feet, and of the two rear rooms, Nos. 2 and 3, each 8,700 cubic feet.

On the second story, the cubical contents of the front room, No. 4, is 11,050 cubic feet, and of the two rear rooms, Nos. 5 and 6, is each 11,250 cubic feet.

A test of this ventilating system was made October 18, between 11.45 A. M., and 3 P. M. Wind northeast, two miles per hour. Outside temperature, 56° F.

Room.	Seats.	Average Attendance.	Temp	VENTILATION.	
				Cubic Feet Per Hour.	Cubic Feet Per Hour to Each Pupil.
1	63	58	70	72,600	1,252
2	59	54	74	91,140	1,688
3	59	54	70	73,351	1,451
4	63	58	68	76,068	1,311
5	59	54	68	91,692	1,698
6	53	47	68	69,297	1,474

Similar tests were made from 1 to 3 P. M., Nov. 18. Outside temperature, 47° F. Wind northeast, 5 miles per hour.

RED ROCK STREET SCHOOL HOUSE
SECTION THROUGH HEATING STOVES AND FRESH AIR INLETS

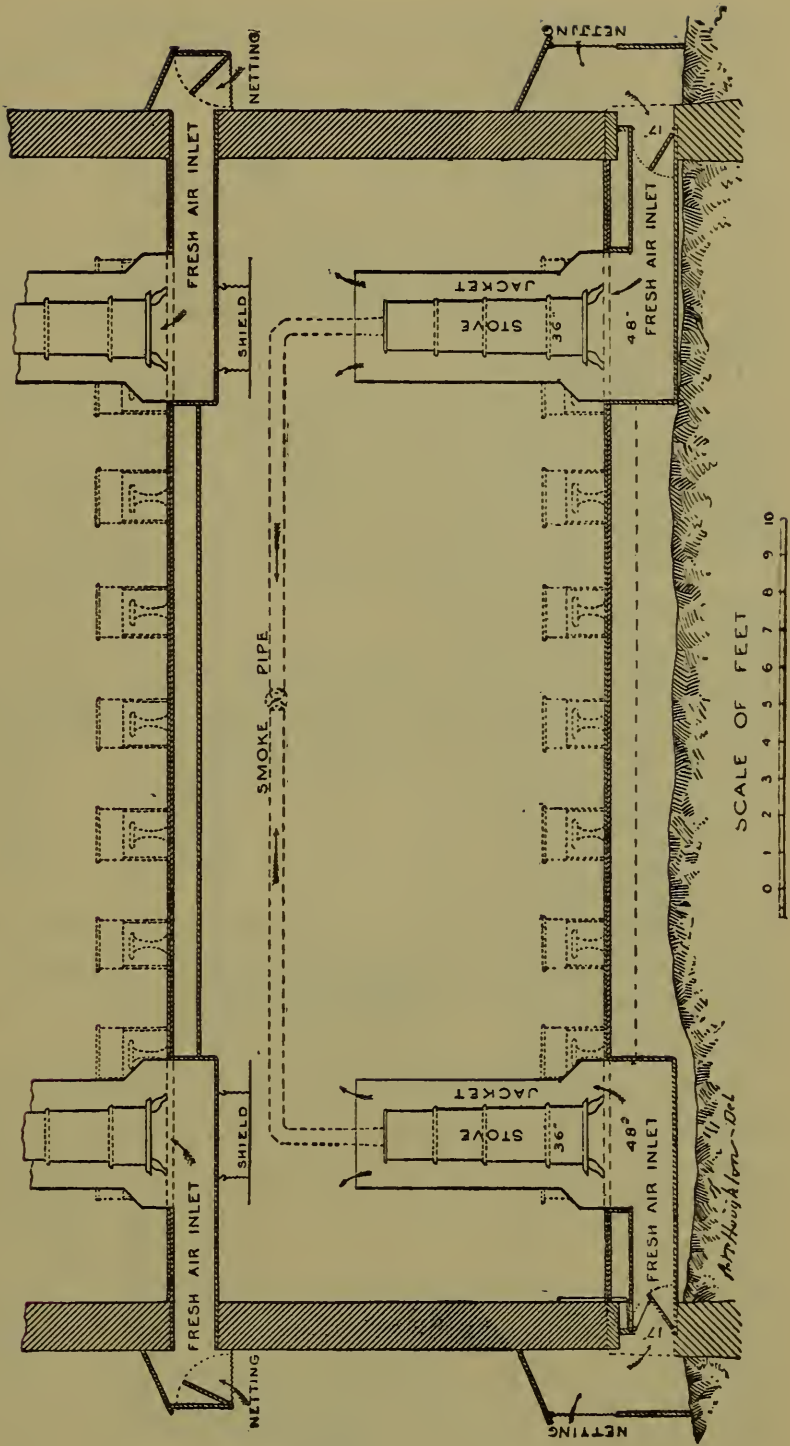


FIG. VI.

Room.	Seats.	Average Attendance.	Temp	VENTILATION.	
				Cubic Feet Per Hour.	Cubic Feet Per Hour to Each Pupil.
1	63	58	80	67,158	1,158
2	59	54	70	79,509	1,472
3	59	54	65	86,940	1,610
4	63	58	75	75,153	1,299
5	59	54	70	82,432	1,527
6	63	47	70	80,270	1,708

At the time of these measurements, other experiments were being made in regard to keeping the rooms at various temperatures.

The ordinary range of temperatures kept in these rooms is shown by tests made during the afternoon of December 9, by Mr. Samuel C. Hunt, Inspector Eastern District Massachusetts District Police. The results obtained by him, rearranged to conform to the foregoing tables, are given below: Wind northwest; temperature 32° F. Fair.

Room.	Seats.	Average Attendance.	Temp at floor.	Temp 5 ft from Floor.	VENTILATION.	
					Cubic ft per Hour.	Cubic ft per Hour to each Pupil.
1	63	58	77	74	136,116	2,347
2	59	54	69	69	139,968	2,592
3	59	54	70	69	147,900	2,739
4	63	58	70	69	91,140	1,570
5	59	54	70	69	101,430	1,878
6	63	47	70	69	137,760	2,909

At a later date an inspection was made of the principal school buildings in Lynn by Rufus K. Wade, Chief of the Massachusetts District Police, accompanied by three of the Inspectors.

This ventilation system received the most searching investigation. The results of the observations in a single room will answer for all. Room No. 1, Centre Street School, Lynn, Mass., 9.30 A. M., Jan. 12, 1891. Temperature outside, 40°. Humidity of air, saturation, (just after a long rain,) wind northeast and velocity barely perceptible. Temperatures in room, middle of floor, 69°, four feet from floor, 71°. These temperatures were the same at different parts of room at desks. Temperature against partition wall three feet from floor, 70°. Incoming air over jacket

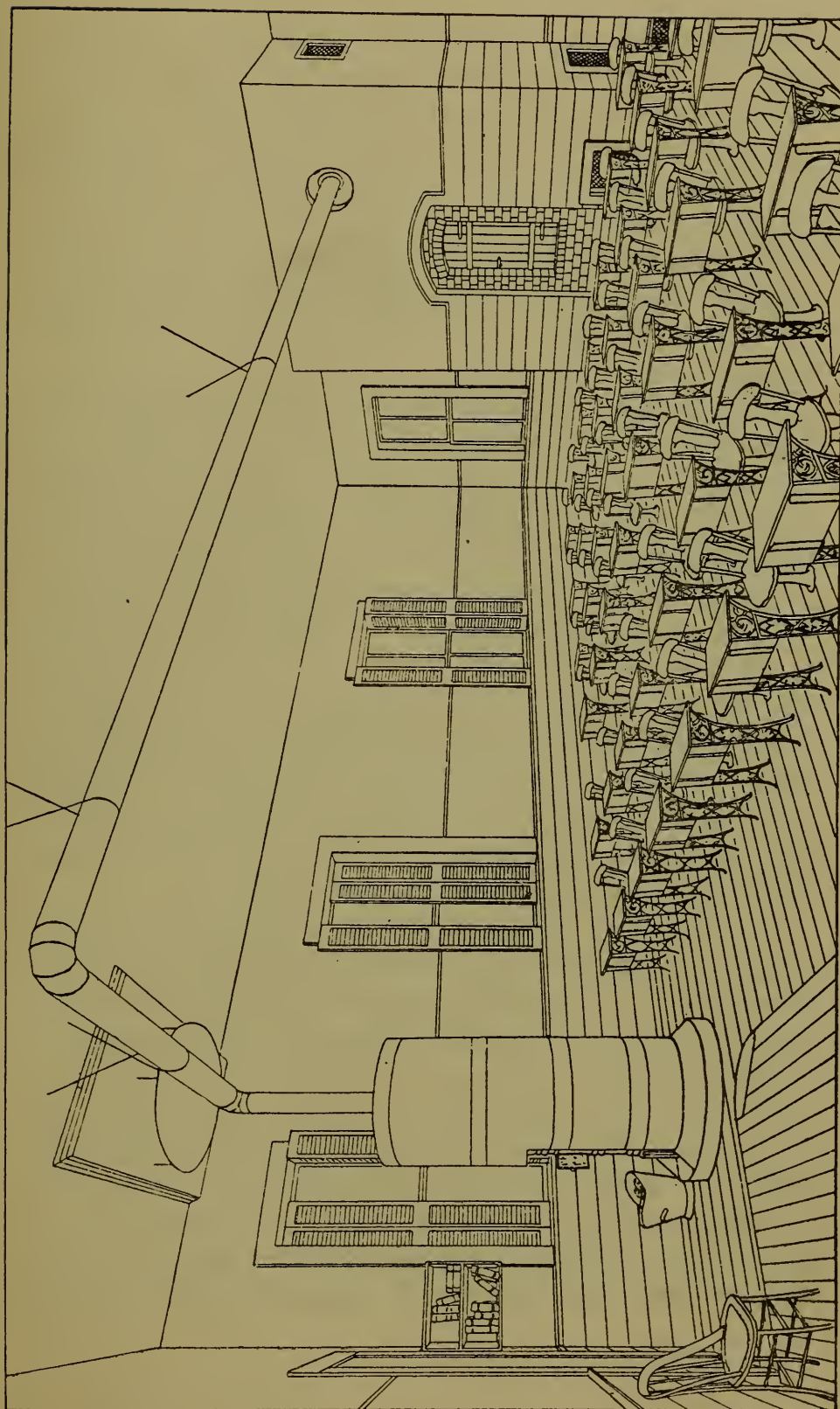


FIG. VII.—RED ROCK SCHOOL.

stove seven feet above floor, 75° ; outgoing air at ventilator, 71° . No appreciable heat radiated from jackets around stoves. No observable motion of air in room. Appearance of pupils healthy; eyes bright; no tendency to irritation and disorder. Ventilation 3,060 cubic feet per hour to each pupil.

The dampers were wide open in order to obtain a measure of the full capacity of the system at the time. Under ordinary conditions, fair ventilation is secured when the dampers are half way open.

The fact that a larger amount of air entered the building through the ventilating flues at the dates of the later observations is explained mainly by the fact that the weather was colder. In warm weather the movement is slower, and some air is usually allowed to enter in other ways.

Tests with a Wolpert's air-tester, made by Mr. Samuel C. Hunt at the inspection, December 9, indicated that the air of these rooms contained from 6 to 8 parts carbonic acid gas per 10,000 of air, a result which, although it cannot be depended on as scientifically accurate, yet helps to show that the ventilation of this school-building is good.

Such a conclusion is consistent also with what would be expected from a circulation of air which averaged at the time 2,339 cubic feet per hour to each pupil.

Dr. Parkes in his *Manual of Hygiene*, states that a child weighing 80 pounds, throws off four-tenths of a cubic foot of carbonic acid gas per hour, and therefore, on this basis, 2,000 cubic feet of air would be vitiated exactly two parts in 10,000 of air.

We may here refer to the results of an analysis of air in eight of the school buildings in Lynn made by Prof. William B. Hills of the Harvard Medical School in 1883, contained on page 25 of the report of Special Committee on the Sanitary Condition of the School Houses, 1883, in which it appears that the amount of carbonic acid

gas ranged from 12.65 to 29.10 parts per 10,000, the impurity of the air in every instance reaching to a degree which all authorities on the subject declare to be highly deleterious to health.

Since its organization in 1884, the Committee on Sanitation of the School Committee has installed this method of ventilation at the Chase Avenue, Baltimore Street (old building), Jackson Street, and Centre Street Schoolhouses.

The method which has been described in detail, refers to its application in buildings heated by stoves, but it is equally adapted to buildings heated by steam, the only modification being that the air is warmed and its circulation maintained in the ventilating shafts by means of steam heating pipes, instead of stoves. This method has been used in the Sanborn, Baltimore Street (new building), and the Blossom Street Schoolhouses, which are heated by steam.

This scheme of ventilation, although not new in its general principles, has, in its details, been designed by members of the Lynn School Committee, and has been installed at a reasonable cost for materials and labor, not augmented by any expenses for patent rights. In each instance, the design of the apparatus has been conformed to meet the requirements of the building to which it was applied. It has improved the facility of uniformly warming school rooms, by the general diffusion of air from the heating apparatus; there have been an absence of drafts and of the discomfort formerly experienced from the opening of doors and windows; the apparatus is so simple that its management is practicable under all conditions of use; it is economical in its operation, the extra cost for fuel being only \$14.00 per year to each room, and where double stoves are used it is evident that the slower rate of combustion is attended with a relatively greater economy of combustion

than where one stove must be forced to keep a school room warm. The results of practical experience and scientific investigation have shown that better conditions of heating and ventilation exist in these schoolrooms than in any other buildings in the city.

To the extent that financial conditions permit, it is hoped that succeeding boards will cause its application to the ventilation of other school-buildings in the city.

In the Centre Street Schoolhouse the whole cost of the heating and ventilating apparatus, including the changes in the old building necessary for the installation amounted to \$1,443.18, or \$240.53 per room.

FLUSH VAULTS TO OUTBUILDINGS.

The outbuildings connected with the schoolhouses have generally been noisome affairs, a nuisance to the neighborhood, and an outrage upon the refinement and decency of the pupils.

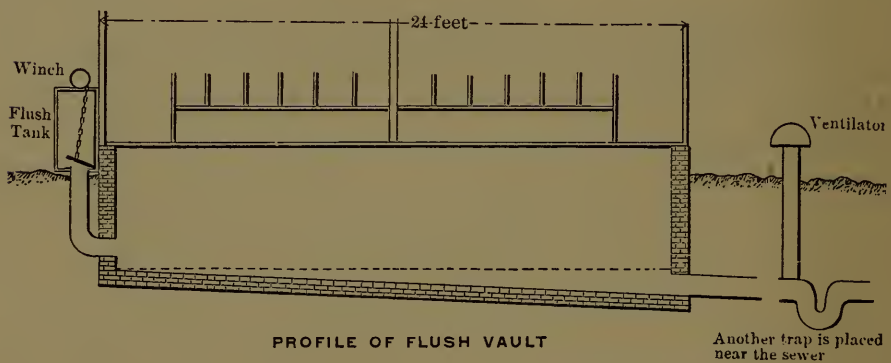


FIG. VIII.

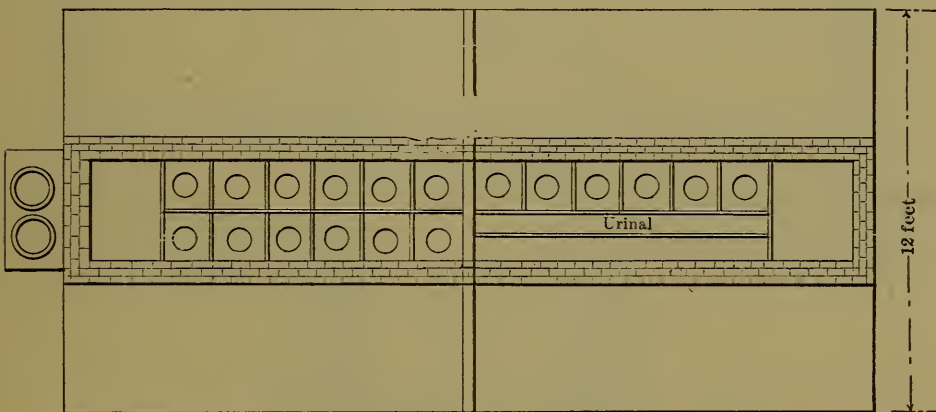
Some of these outbuildings have been supplied with a kind of flush vault which in its present form originated with former Committees on Sanitation.

The illustrations clearly show the present method of constructing these flush vaults, which are like those made at first, with the exception of slight modifications resulting from experience.

The vault is built of hard bricks laid in cement, and is about three feet in width and five feet in depth, the bottom being an inverted arch, and the whole sloping one-half inch to the foot towards the discharge into the sewer. The flush-tank varies slightly according to circumstances, the most convenient dimensions usually being in inside measurements, three feet nine inches long, one foot ten inches wide, and holding water to the depth of four feet thus having a capacity of 206 gallons.

At the bottom of the tank two glazed earthen drain pipes one foot in diameter lead to the end of the vault, the curve being on a radius of about five feet.

The present form of flap-valve was adopted after some experimenting, to fix upon a form of valve which should



PLAN OF FLUSH VAULT

FIG. IX.

give an unobstructed flow to the water, hold the tank full at other times, and also be constructed at little cost.

The bell-mouth end of the outlet pipe reaches nearly to the bottom of the tank, and a flat ring of cast-iron half an inch thick, two-and-a-half inches face and twelve inches in diameter with an inside rim four inches deep, projects into the enlarged end of the pipe.

This ring is screwed to the bottom of the tank, and the joint made tight by a rubber gasket. The flap-valve consists of a cast-iron plate with a boss at one side forming a hinge with a piece secured to the bottom of the tank.

The valve face is made of a piece of rubber three sixteenths of an inch thick and is held in place by a circular piece of board held firm by screws passing through the plate into the wood, which is eleven inches in diameter

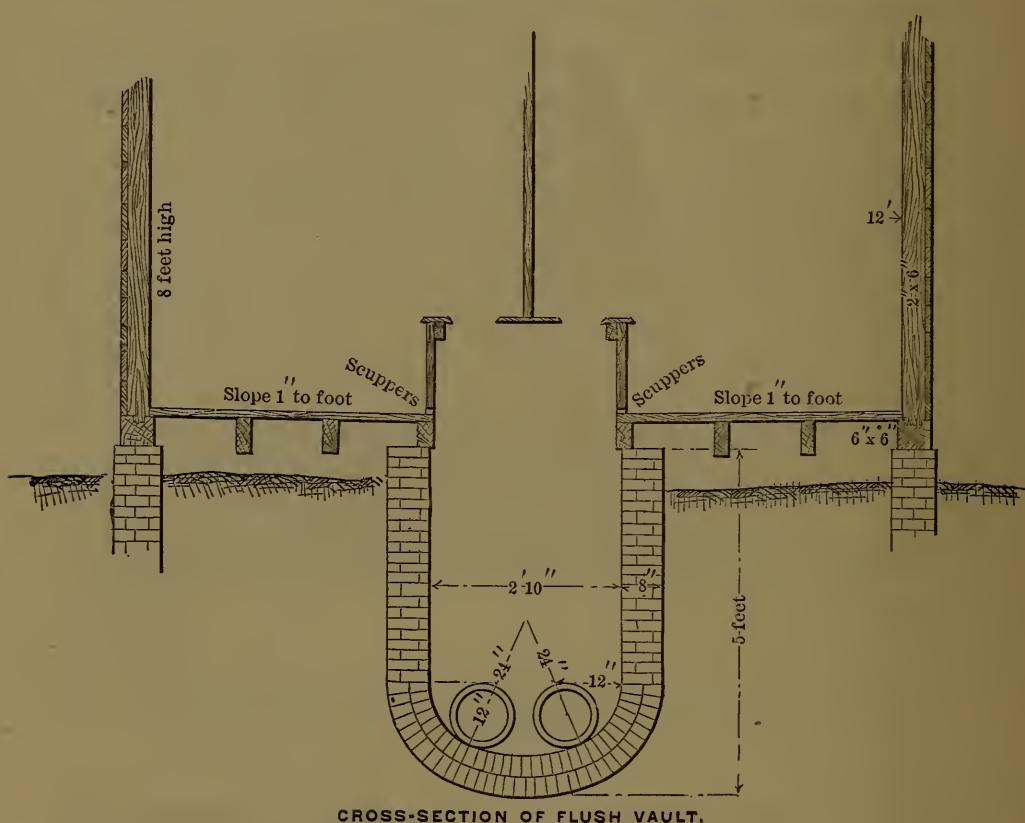


FIG. X.

and projects into the mouth of the outlet pipe when the valve is shut. The hinge is not rigid, as the bolt is one-half inch in diameter and the hole in the boss from the cover is three-quarters of an inch in diameter, this makes a yielding connection which allows the valve to conform to

the valve seat described above, and to be held securely to its seat by the water pressure, which under a depth of four feet in the tank amounts to 198 pounds; to which should be added the weight of the valve, 30 pounds, making the whole load on one of these valves 228 pounds, which is sufficient to keep it perfectly tight. A chain from each of these valves extends to a drum on the shaft at the top of the tank, and affords a means of easily opening the valves by turning a crank at the end of the shaft. The chain in Fig. XI can be attached to the outer edge of the valve, whenever such a connection to the winch may be more convenient.

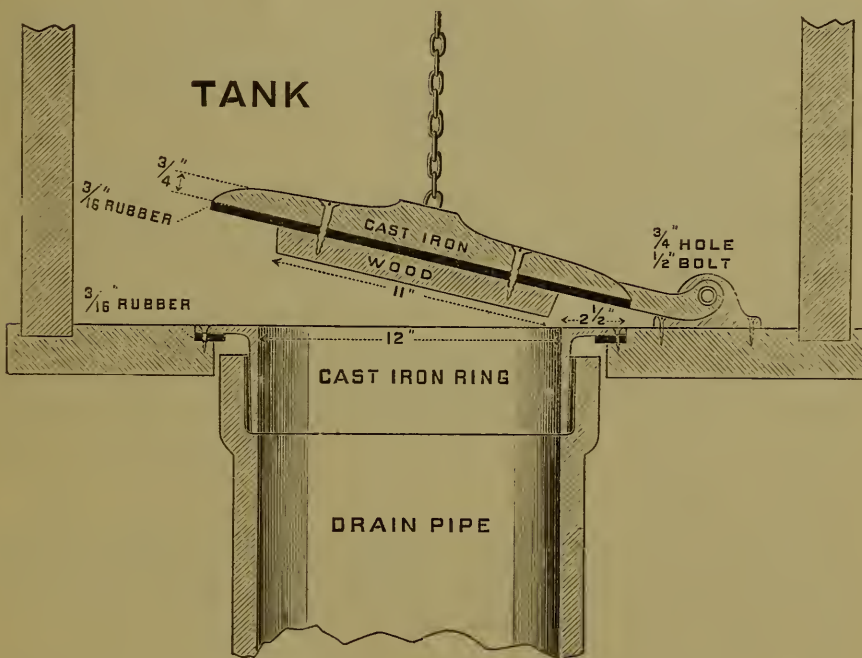


FIG. XI.

The outlet from the flush vault to the street sewer is one foot in diameter, with one trap near to the outbuilding and the other near the street line.

These traps are provided with manholes, and it has been found preferable that the covers should be four to six

inches below the surface of the ground. Turns in the outlet pipe are made by using half pipe of about five feet radius set in a brick pavement covered by a manhole. Where this method has been used, there has not been any serious difficulty from a clogging of the pipe with the articles of waste which are frequently thrown into school vaults. The conductors leading from the roofs enter this outlet pipe, and serve the purpose of keeping the school-yard free from the scouring caused by rain water from the roof flowing over the yard, of flushing the outlet pipe, and also of ventilating the discharge pipe.

The method of operating this flush vault is very simple. The janitor gives one turn to the crank at the flush tank and the contents of over 200 gallons are discharged in three seconds, rushing along the vault at a rapid rate and scouring away all deposits.

The outbuildings above the vault are not changed from what they were before, except that the floors slope about a quarter of an inch to the foot towards the seats; and scupper holes measuring two by four inches are cut through the riser to the seats, at a level of the floor, so that when the floor is washed by means of a hose connection at the water pipe feeding the tank, the water runs into the vault below.

A piece of roofing slate is nailed on the inside of the riser in front of each seat, and prevents the wood from absorbing the moisture and becoming offensive.

These flush vaults have been placed in the following school-yards: Whiting, Shepard, Cobbett Primary, Hood, Blossom, School, Lower Franklin, Baltimore, Grove Streets and Oakwood Avenue. It is the policy of this committee to ask for authority of the School Board to add similar flush vaults whenever a sewer is laid in any street passing a school-yard.

VENTILATION COMPULSORY BY LAW.

The methods of school ventilation and sanitation original, to a large extent, with this committee, have been described and illustrated somewhat in detail, in order that others who may desire to adopt such apparatus, may be provided with data that can be used in preparing designs adapted to other school buildings.

The work of the Committee on Sanitation was begun in 1883, and was first applied in schoolhouses where the air was so bad that the scholars were exposed to seriously unhealthy conditions.

The exact measure of the vitiation of air in these cases, and also the extent to which the evil was remedied, have been determined by chemical analyses of the air in the school rooms made before and after the introduction of the ventilating apparatus. The facts showing this scientific proof of the value of the method have been fully set forth in the yearly reports of the Committee on Sanitation, and in the report of the State Board of Health for the year 1887.

It is fair to presume that the results in methods of school sanitation in which Lynn has been a pioneer, had some influence in securing the present satisfactory legislation on the subject.

Since the year 1888 the work of this Committee in ventilating schoolhouses, and in providing other improved sanitary arrangements, has been performed in obedience to the law of the Commonwealth of Massachusetts, which is given below :

CHAPTER 149. IN THE YEAR 1888.

AN ACT TO CAUSE PROPER SANITARY PROVISIONS AND PROPER VENTILATION IN PUBLIC BUILDINGS AND SCHOOLHOUSES.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:—

SECTION 1. Every public building and every schoolhouse shall be kept in a cleanly state, and free from effluvia arising from any drain,

privy, or other nuisance, and shall be provided with a sufficient number of proper water-closets, earth-closets or privies, for the reasonable use of the persons admitted to such public building, or of the pupils attending such school-houses.

SEC. 2. Every public building, and every schoolhouse, shall be ventilated in such a proper manner, that the air shall not become so exhausted as to be injurious to the health of the persons present therein. The provisions of this section, and the preceding section shall be enforced by the inspection department of the district police force.

SEC. 3. Whenever it shall appear to an inspector of factories and public buildings that further or different sanitary provisions or means of ventilation are required in any public building or schoolhouse, in order to conform to the requirements of this act, and that the same can be provided without incurring unreasonable expense, such inspector may issue a written order to the proper person or authority directing such sanitary provisions, or means of ventilation to be provided, and they shall thereupon be provided in accordance with such order by the public authority, corporation or person having charge of, owning or leasing such public building or school-house.

SEC. 4. Any School Committee, public officer, corporation or person neglecting for four weeks after the receipt of an order from an inspector, as provided in the preceding section, to provide the sanitary provisions or means of ventilation required thereby shall be punished by fine not exceeding one hundred dollars.

SEC. 5. The expression "public building" used in this act means any building or premises used as a place of public entertainment, instruction, resort or assemblage. The expression "schoolhouse" means any building or premises in which public or private instruction is afforded to not less than ten pupils at one time.

SEC. 6. This act shall take effect upon its passage.

Approved, March 20, 1888.

MISCELLANEOUS.

The other changes in construction made by this committee, have been the much needed water closets for teachers' use in the Fayette Primary, and the changing of water pipes in the Highland School where they were exposed to freezing every winter, and were thus rendered out of service and a continual expense for repairs every spring. These pipes have been changed to a warmer position, and have not been frozen up to the date of this

report. It is probable that similar mishaps will not occur again.

CURTAINS.

This committee has given attention to the lighting of school-rooms, and has endeavored to remove conditions tending to injure the eyesight of pupils and teachers.

It has not been found to be feasible to move the position of windows in many school-rooms where such changes would be advantageous in every respect, but the committee has continued its practice of placing curtains of neutral tint wherever it became necessary to put new curtains in any schoolhouse.

During the past year, changes of curtains have been made to a greater or less extent in accordance with the needs of each instance at the Whiting, Ingalls and Centre Street schoolhouses.

HEAT REGULATING APPARATUS.

The appliances of the Johnson system of heat regulation were attached to the steam heating apparatus at the Baltimore Street schoolhouse in the Autumn of 1889, after a careful examination into the merits of this device.

In its operation, it has filled the several guarantees made by the agent of the manufacturers; and has also given general satisfaction by the efficient manner in which it has served its purpose. Its further introduction may be recommended.

THE NEW HIGH SCHOOL BUILDING.

The designing of the heating and ventilating apparatus in the new high schoolhouse has been entrusted to Mr. S. H. Woodbridge by the Committee of the City Government having the matter in charge.

The plan of ventilation proposed by that gentleman is of a most satisfactory character, having in view the supply of an abundance of pure air at the desired temperature and without draughts.

The steam boilers, and nearly all the plumbing apparatus will be outside of the main building.

The great public interest felt in the subject, is the reason for this allusion to a matter which is not as yet in charge of the Committee on Sanitation, and to which their consideration was called as a matter of courtesy by the Committee of the City Government having in charge the building of the new high schoolhouse.

The payments charged to the Com-	
mittee on Sanitation during 1890,	
have been	\$1,955.22
This included bills incurred during the	
previous year to the amount of	50.90
	—————\$1,904.32
Outstanding bills	51.02
	—————
Expenditures for the Committee on	
Sanitation for the year 1890. . .	\$1,955.34

Respectfully submitted.

C. J. H. WOODBURY, <i>Chairman.</i>	} Committee on Sanitation.
JOSEPH G. PINKHAM, M. D.,	
FRANCIS T. HAZELWOOD, D. D.	

LYNN, Dec. 30, 1890.

LIBRARY OF CONGRESS



0 021 332 831 1



LB

3231

28

1890

LIBRARY OF CONGRESS



0 021 332 831 1